

Psychological Impact of the Armed Conflict on Sudanese Dental Students in 2024

2024 Yılında Silahlı Çatışmanın Sudanlı Diş Hekimliği Öğrencileri Üzerindeki Psikolojik Etkisi

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ABSTRACT

Objective: To assess the psychological effects of armed conflict on dental students in Sudan, focusing on psychological distress, general well-being, academic performance, and professional development.

Methods: A cross-sectional study was conducted to collect demographic data and assess levels of depression, anxiety, and stress using the Depression, Anxiety, and Stress Scale (DASS-21). The study also examined the impact of these factors on professional development. Data analysis included comparisons based on the year of study, gender, and exposure to conflict. Statistical analysis was performed using SPSS v22.

Results: The study found a high prevalence of psychological distress, with depression being the most common condition. Female students and those in their final year reported higher levels of stress, anxiety, and depression ($P<.05$). Psychological distress negatively affected academic performance and professional development, although coping mechanisms like spiritual support played a significant role. The mean scores were 18.9 (SD=10.0) for depression, 19.2 (SD=9.5) for stress, and 13.4 (SD=9.2) for anxiety. Depression was the most prevalent, affecting 70.9% of participants, followed by anxiety (63.6%) and stress (50.9%).

Conclusion: The study finds increased stress, anxiety, and depression among dental students in Sudan due to ongoing conflict, particularly in female students and those nearing graduation. It calls for mental health programs at universities, including counseling and support services, and government funding to support affected students in conflict zones.

Keywords: Armed conflict, psychological distress, dental students, academic performance, professional development, coping mechanisms.

ÖZ

Amaç: Silahlı çatışmanın Sudan'daki diş hekimliği öğrencileri üzerindeki psikolojik etkilerini psikolojik sıkıntı, genel refah, akademik performans ve mesleki gelişime odaklanarak değerlendirmek.

Yöntemler: Bu çalışmada, demografik verilerin toplanması ve Depresyon, Anksiyete ve Stres Ölçeği (DASS-21) kullanılarak depresyon, anksiyete ve stres düzeylerinin değerlendirilmesi amaçlanmıştır. Ayrıca, bu faktörlerin profesyonel gelişim üzerindeki etkileri incelenmiştir. Veri analizi, yıl bazında, cinsiyet ve çatışma maruziyeti gibi değişkenlere göre karşılaştırmalar yaparak gerçekleştirilmiştir. İstatistiksel analiz SPSS v22 kullanılarak yapılmıştır.

Bulgular: Çalışma, psikolojik sıkıntının yüksek prevalansını buldu; depresyon en yaygın durum olarak belirlendi. Kadın öğrenciler ve son sınıfta olanlar daha yüksek düzeyde stres, anksiyete ve depresyon bildirdi ($P<.05$). Psikolojik sıkıntılar, akademik performans ve profesyonel gelişimi olumsuz yönde etkiledi, ancak başa çıkma mekanizmaları, özellikle manevi destek, önemli bir rol oynadı. Ortalamalar şu şekildediydi: depresyon için 18,9 (SD=10,0), stres için 19,2 (SD=9,5) ve anksiyete için 13,4 (SD=9,2). Depresyon, katılımcıların %70,9'unu etkileyerek en yaygın durum olarak tespit edildi; bunu %63,6 ile anksiyete ve %50,9 ile stres izledi.

Sonuç: Çalışma, Sudan'daki diş hekimliği öğrencileri arasında, özellikle kadın öğrenciler ve mezuniyetine yakın olanlarda, devam eden çatışmalar nedeniyle artan stres, anksiyete ve depresyon bulgularına rastlanmaktadır. Çalışma, üniversitelerde danışmanlık ve destek hizmetlerini içeren ruh sağlığı programlarının oluşturulmasını ve çatışma bölgelerinde etkilenen öğrencilere destek sağlamak amacıyla hükümet fonlaması çağrısında bulunmaktadır.

Anahtar Kelimeler: Silahlı çatışma, psikolojik sıkıntı, diş hekimliği öğrencileri, akademik performans, mesleki gelişim, başa çıkma mekanizmaları.

INTRODUCTION

Armed conflict refers to prolonged fighting between organized groups, such as nations or factions, typically involving regular or irregular military forces. These conflicts often lead to significant humanitarian



crises, affecting civilians' lives, infrastructure, and the overall stability of affected regions.¹ Furthermore, armed conflicts and wars persist as global challenges, impacting millions of lives. By 2030, nearly half of the world's poorest people are predicted to reside in conflict-affected countries.²

Wars have profound and multifaceted effects on nations, extending beyond immediate casualties and physical destruction. They disrupt economies, strain healthcare systems, and devastate educational infrastructures.³ Educational institutions, from schools to universities, often bear the brunt of conflict through destruction and closure.⁴ This disruption not only limits access to education but also compromises its quality as resources become scarce.⁵ In medical education specifically, war exacerbates these challenges by affecting the availability of clinical training facilities and qualified faculty.⁶ The psychological toll on students—compounded by the stress of learning in conflict zones—further undermines their academic performance and professional development.⁷

Armed conflict has profound psychological impacts on individuals, particularly affecting mental health by increasing rates of post-traumatic stress disorder (PTSD), depression, and anxiety among affected populations.⁸ These impacts can be both direct—such as trauma from violence—and indirect, including displacement, loss of homes, and breakdown of social networks that contribute to feelings of isolation and distress.⁹ Armed conflict in Sudan has had significant effects on society, particularly on education. Armed conflicts have persisted for decades in regions such as Darfur, South Kordofan, and South Sudan.¹⁰ The most recent conflict erupted on April 15, 2023, primarily centered in Khartoum before spreading to other states.¹¹ This ongoing conflict has severely impacted various sectors, including medical education. In addition to direct damage to infrastructure, the war has profoundly affected the mental health of students and teachers.¹² Psychological crises such as anxiety and depression have become common among students who face insecurity and fear for their future.¹³ Moreover, the lack of psychosocial support exacerbates these issues.¹³ Conflict affects general well-being, professional development, coping strategies, and support mechanisms.

The primary goal of this study is to evaluate the psychological effects of armed conflict on dental students in Sudan. Specifically, it aims to assess how exposure to conflict affects students' psychological well-being while evaluating current support systems. The study also provides recommendations for enhancing psychological health interventions in educational contexts and addresses the unique challenges faced by dental students during armed conflict.

METHOD

Ethical Approval and Study Design

Ethical approval for the study was obtained from the Ethics Committee of the Research and Publication Office, Dental Alumni and Students Affairs Office, Karary University, ensuring that all procedures adhered to ethical guidelines to protect participants' rights, confidentiality, and well-being throughout the study (Approval No: 24001; Approval Date: April 20, 2024).

A descriptive cross-sectional study was conducted in May 2024 to examine the psychological effects of armed conflict on dental students at Karary University, Sudan. The study employed an active surveillance approach using an online survey distributed through students' official university email accounts via Google Forms. The study included all first-through fifth-year students.

Sampling and Data Collection

Convenience sampling was used to recruit participants for the study. The Depression Anxiety Stress Scales-21 (DASS-21), a validated psychometric tool, was employed to assess psychological distress among participants, focusing on symptoms of depression, anxiety, and stress.¹⁴ The DASS-21 measures psychological distress through 21 items divided into three subscales: depression, anxiety, and stress. Participants responded using a four-point Likert scale ranging from "0" (did not apply to me at all) to "3" (applied to me most or all of the time). The questionnaire also included sections on demographic information (gender, year of study, state of residence), the impact of conflict on academic performance and well-being, and coping strategies. Specific questions assessed perceived stress levels, changes in study habits, and access to mental health support.

Statistical Analysis

Data were analyzed using version 22.0 of the Statistical Package for Social Sciences (IBM SPSS Corp., Armonk, NY, USA). Spearman's correlation was used to examine relationships between dependent variables and the impact of armed conflict. DASS-21 scores were categorized into three levels of severity: mild, moderate, and severe. Participants were classified as "psychologically normal" or "psychologically distressed" based on these scores. Logistic regression analyses were performed for each type of distress to predict probabilities.

RESULTS

This study was conducted during the armed conflict in Sudan in 2024 and involved dental students from Karary University. The Depression, Anxiety, and Stress Scale (DASS-21) was used to assess psychological distress among participants by investigating symptoms of depression, anxiety, and stress. A P value of less than .05 was considered significant for all statistical analyses, and the reliability test using Cronbach α based on standardized items was .926. A linear regression test was used to measure the psychological impact of the armed conflict on dental students in Sudan in 2024. The value of the linear regression test R was .233, with an ANOVA test P value less than .05, indicating statistically significant results.

A total of 110 participants completed the questionnaire and provided their consent to participate in the study. The majority of the study participants, 85 (77.3%), were female, and about 25 (22.7%) were male (Table 1); the mean age of the participants was 24 years (Table 1). The participants' current year of study ranged from the first to fifth year, with most in their fifth year, accounting for 40 (36.4%) of the total (Table 1). The majority of participants, 53 (48.2%), were in war-affected states when the conflict began; currently, about half reported having changed their residence due to the ongoing war, with 61 (55.5%) now living outside Sudan (Table 1).

The overall mean \pm SD scores for the depression, stress, and anxiety subscales were 18.9 \pm 10.00, 19.2 \pm 9.5, and 13.4 \pm 9.2, respectively; the anxiety subscale had lower mean and SD values compared with the other subscales (Table 2).

Regarding the distribution of participants based on categorization of their DASS-21 subscale scores, depression was most prevalent among participants (70.9%), followed by anxiety (63.6%) and stress (50.9%) (Table 3).

Psychological distress significantly varied across academic years (Table 4). The P value for stress ($P = .004$) indicated a strong association between academic level and stress levels; similarly, anxiety ($P = .020$) and depression ($P = .017$) also varied significantly, suggesting that certain academic years—especially the final year—were associated with higher distress levels.

Table 1. Demographic characteristics of participants

Demographic data		N (%)
Gender	Male	25 (22.7)
	Female	85 (77.3)
Years of study	First year	8 (7.3)
	Second year	20 (18.2)
	Third year	25 (22.7)
	Fourth year	17 (15.5)
	Fifth year	40 (36.4)
Residence time of war	War-affected state	53 (48.2)
	Outside Sudan	23 (20.9)
Current residency	State outside the war -zone	34 (30.9)
	On the war-affected state	21 (19.1)
	Outside Sudan	61 (55.5)
	State outside the war -zone	28 (25.5)

Table 2. Means and SD of the Participant's DASS-21 Sub-Scales Scores

DASS-21 sub-scales score	Mean ± SD
Stress score	19.2±9.5
Anxiety score	13.4±9.2
Depression score	18.9±10.0

Table 3. Distribution of psychological distress among participants based on their dass-21 sub-scale score

	Stress N%	Anxiety N%	Depression N%
Normal	25 (22.75%)	30 (27.3%)	21 (19.1%)
Mild	29 (26.4%)	10 (9.1%)	11 (10.0%)
Psychologically distress	56 (50.9%)	70 (63.6%)	78 (70.9%)
Moderate	32 (29.1%)	30 (27.3%)	31 (28.2%)
Severe	16 (14.5%)	13 (11.8%)	24 (21.8%)
Extreme severe	8 (7.3%)	27 (24.5%)	23 (20.9%)

Table 4. Comparison between the Participants based on Years of study

	F	Sig.
Stress score	4.169	.004
Anxiety score	3.040	.020
Depression score	3.168	.017

In terms of gender differences in psychological distress, females experienced more distress: extreme and severe levels of depression reached 17.27%, extreme anxiety was at 20.9%, and severe stress was at 11.3%, compared with males who showed less than 4% for severe levels of stress, anxiety, and depression. Fifth-year students were most affected: extreme anxiety was reported by 10%, extreme depression by 8.18%, and severe stress by 5.45%. Second-year students followed with equal levels of extreme anxiety and severe stress at 6.3% each; extreme depression was reported by 5.45%. First- and fourth-year students were less affected.

More than 90% of participants did not seek professional or institutional support to cope with their psychological distress; however, some students used coping mechanisms such as turning to faith and spiritual beliefs (18.18%), staying in a safe place (15.45%), limiting exposure to media (7.2%), and receiving support from family and friends (6.3%). Approximately 7% did not have any strategy to deal with their psychological distress.

Regression analysis revealed a statistically significant negative relationship between psychological distress and well-being ($R = -0.233$; $P < .05$). Although the correlation was weak ($R^2 = .054$), it suggested that as distress increased, well-being moderately decreased; this small effect size implied other contributing factors may also play a role (Figure 1,2).

The χ^2 test for independence revealed a significant negative relationship between psychological distress and hindered progress in clinical training and career development (Spearman rho = -0.164 ; $P = .004$). Despite statistical significance, the effect size appeared moderate, suggesting distress is one of several influencing factors.

The χ^2 test also showed a significant negative association between psychological distress and academic performance (Spearman rho = -0.196 ; $P < .05$), indicating that.

Did you seek any professional or institutional support for your psychological well-being during armed conflict

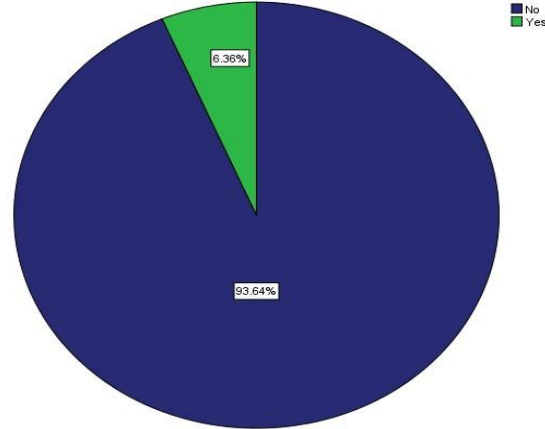


Figure 1. Professional or personal support for students psychological well-being during the armed conflict

What strategies or coping mechanisms have you used to manage psychological distress during the armed conflict

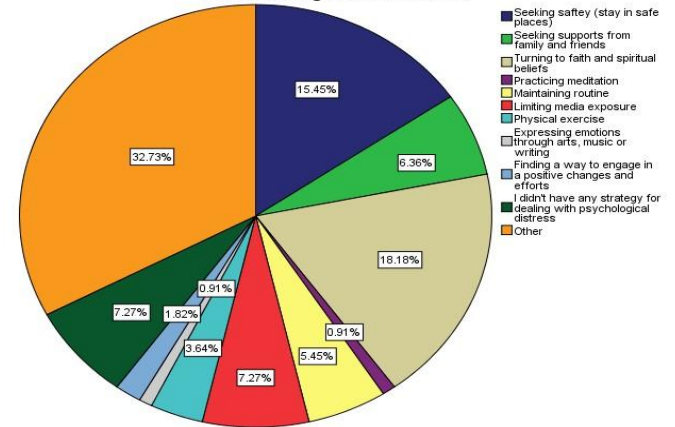


Figure 2. Strategies or coping mechanisms have you used to manage psychological distress during the armed conflict?

DISCUSSION

This study provides a comparative analysis of stress, anxiety, and depression scores among participants based on their academic years, revealing significant differences in psychological distress. Several studies have examined the psychological impact of armed violence on students. For example, a study conducted in Syria reported that armed conflict had a substantial negative effect on students' mental health, with 75% experiencing moderate to severe psychological distress.¹⁵ Additional research has shown that university students' mental health is

significantly affected by war, with high prevalence rates of post-traumatic stress disorder (PTSD), depression, and anxiety.^{16,17} Similarly, a study conducted in Nigeria demonstrated that stress associated with conflict significantly impacted students' mental health, leading to higher levels of anxiety and depression.¹⁸ Using similar DASS-21 measurements, the study in Nigeria (N=500) found that approximately 60% of participants reported experiencing psychological distress, with significant levels of anxiety and depression, which aligns with our findings.¹⁸

Our results indicate that female students experienced higher levels of psychological distress compared to their male counterparts, with significant percentages reporting severe and extreme levels of depression, anxiety, and stress. This may be attributed to social expectations and increased caregiving responsibilities. These findings are consistent with studies conducted in conflict-affected regions such as Syria and Nigeria, which also report higher distress levels among female students due to gender-specific vulnerabilities.^{15,18} Other studies have similarly reported greater vulnerability among women to psychological distress in conflict zones.^{19,20} However, the higher percentage of female participants in our study (77%) may have contributed to this observed difference; thus, this imbalance should be considered when interpreting the findings. For example, Al-Krenawi and Graham's study (N=971) included 57% female participants but did not specify exact gender distributions in other studies.

Fifth-year students were the most affected group in our study, experiencing higher levels of extreme anxiety and depression compared to other academic years. This may be attributed to additional stressors associated with nearing graduation and entering the workforce amidst an unstable political and social environment. Similar observations have been reported in previous studies where students in higher academic years experienced greater stress due to compounded pressures from conflict and academic responsibilities.²¹ For example, research conducted in Sierra Leone (N=1,100 youth) documented increased PTSD and academic disruption among older students.^{23,24} In our study, this finding may also be influenced by the higher number of fifth-year students; further research with more balanced sample distributions is recommended to determine which groups are most affected.

Our findings further highlight that psychological distress from conflict significantly impacted professional development and academic performance among dental students. Although not statistically significant, high levels of stress and anxiety appeared to impede professional growth by affecting focus during clinical training, reducing confidence, impairing decision-making abilities, and negatively influencing time management and communication skills. Some students struggled to attend practical sessions due to mental exhaustion and burnout, delaying skill acquisition. Similar findings have been reported in Gaza, Sri Lanka, and Sierra Leone, Betancourt et al.,²⁵ where conflict-related trauma lowered students' aspirations and hindered professional development due to disrupted clinical training, loss of faculty mentorship, and uncertainty about future employment.²²⁻²⁴ These observations underscore the need for structured psychological support programs to aid students' professional development despite external stressors.

Regarding the impact of psychological distress on academic performance, our study found that armed conflict negatively affected students' educational outcomes. This finding is consistent with research conducted in Iraq showing that exposure to conflict led to lower academic achievements and higher dropout rates among students.²⁶ Similarly, studies conducted in Colombia²⁷ and Uganda²⁸ reported that conflict-related violence negatively impacted educational outcomes such as grades and school attendance.

Various coping mechanisms were employed by students to manage psychological distress during armed conflict; faith and spiritual beliefs were the most prevalent strategies (reported by 15.5% of participants). This highlights the significant role spirituality plays in providing psychological comfort and resilience during adversity. Studies conducted in Libya²⁹ and Congo³⁰ support these findings by showing that students often rely on social and religious support as primary coping strategies during conflict. However, while faith-based coping strategies (18.18%) were commonly used by participants in our study, their long-term effectiveness remains uncertain. Although some students reported temporary relief from these strategies, 67% continued to experience persistent anxiety and depression. While informal coping mechanisms are essential for emotional stability during stressful periods such as exams or clinical assessments, their impact may be limited without additional professional mental health support such as counseling or mindfulness programs.

Cultural factors unique to Sudan may further influence students' psychological states during armed conflict. Mental health remains a taboo subject in many Sudanese communities; it is often perceived as a weakness or failure or viewed through a spiritual lens rather than a clinical one. Consequently, many students may avoid discussing their psychosocial distress or seeking help from mental health professionals. In this study, more than 90% of participants did not access formal psychological support despite experiencing high levels of distress. Social norms emphasizing resilience and patience—especially for youth and females—may discourage emotional vulnerability or openness about mental health concerns. Additionally, reliance on religious or family support as primary coping strategies reflects Sudan's communal culture; while these sources provide emotional comfort for many individuals facing adversity, they may not address clinical aspects of psychological disorders effectively.

To address these challenges within Sudanese universities, culturally tailored interventions are necessary to reduce stigma surrounding mental health while integrating psychoeducation into existing social structures such as family networks or religious communities for improved accessibility and acceptance of formal support services³¹⁻³². Structured programs combining psychoeducation with professional counseling services could help mitigate long-term psychological effects among university students exposed to armed conflict.

Limitations and Suggestions for future researches

Limitations and Future Directions

The sample size in this study was relatively small and focused on only one institution, which may limit the generalizability of the findings. The use of convenience sampling and an online survey mode may have introduced selection bias, potentially excluding students without internet access or those severely impacted by the conflict, which could have restricted their participation. Additionally, the cross-sectional design of the study prevents any conclusions about the long-term effects of psychological distress related to armed conflict. Future research should adopt a longitudinal design to examine students' mental health over time and determine whether they experience similar patterns of recovery or decline.

Future studies should also include larger demographic samples across multiple geographic regions and universities in Sudan. Comparative studies between conflict-affected and non-conflict-affected areas would provide valuable insights into how exposure to violence influences psychological outcomes. Interdisciplinary research is needed to address mental health, educational outcomes, and sociopolitical factors to understand systemic mechanisms that predict

psychological distress. Qualitative studies exploring students' lived experiences, coping mechanisms, and narratives could further elucidate resilience and trauma within conflict settings.

In addition, involving educational leaders, university administrators, and mental health professionals in future research could help develop more effective institutional responses to student needs during crises. Evaluating specific interventions—such as mindfulness programs, tele-counseling services, or peer-led initiatives—could provide evidence-based recommendations to enhance student well-being during armed conflict.

CONCLUSION

This study reveals a significant increase in stress, anxiety, and depression among dental students in Sudan due to the ongoing armed conflict. Higher levels of psychological distress were observed among female students and those nearing the completion of their studies. These findings underscore the urgent need for practical interventions within educational systems to address mental health challenges among students in conflict-affected regions.

Universities should establish mental health programs on their campuses that include professional counseling services, peer-support groups, and digitally accessible mental health resources tailored for students in impacted zones. Faculty members can be trained to provide psychological first aid and implement academic accommodations—such as flexible deadlines, reduced workloads, and exam modifications—to alleviate academic burdens while supporting students' career development.

Government funding should be mobilized to support these interventions, particularly for vulnerable populations identified in this research. Rather than waiting for gradual improvements in mental health outcomes, these measures offer an immediate response to mitigate the psychological consequences of living and studying in a conflict-affected environment. Such interventions would not only contribute to student resilience but also promote academic success and career advancement.

Ethics Committee Approval: Ethical approval for the study was obtained from the Ethics Committee of the Research and Publication Office, Dental Alumni and Students Affairs Office, Karary University, ensuring that all procedures adhered to ethical guidelines to protect participants' rights, confidentiality, and well-being throughout the study (Approval No: 24001; Approval Date: April 20, 2024).

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